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## THE WAR AND THE WORLD'S MERCANTILE MARINE

The recent issue of *Lloyd's Register of Shipping* for 1919-1920 is the first publication giving a comprehensive and reliable view of the effects of the late war upon the world's mercantile marine. It is the first edition issued entirely free from censorship since the war began. The main body of the Register contains particulars of practically all sea-going vessels of 100 gross tons and upwards, and has been carefully revised and brought down to date. Concealment as regards losses has been eliminated, and the facts with reference to the vessel tonnages of the commercial nations of the world are presented in its statistical tables in such form as to show some of the salient features of the shipping situation.

This situation reveals some notable changes during the five years which elapsed since the last pre-war issue of 1914-1915.<sup>1</sup> These changes, the results of war conditions, show a greatly lessened rate of growth for the world's mercantile tonnage as a whole, a marked deterioration in certain respects both of the vessels operating on the high seas and of the ocean service generally, and, more important, a significant redistribution of the world's shipping. The world war seriously curtailed the vessel tonnage of some countries and reduced the rate of growth of most others. The wastage wrought near the region of hostilities, however, gave a powerful impetus to the development of the mercantile marine of the United States, which rose within a few years from a position of relative insignificance in the building and operation of vessels engaged in international commerce to one of commanding importance.

Since the signing of the armistice there has been much discussion concerning the permanence of the changes brought about by the war, especially of the remarkable growth of the American mercantile marine. Have these changes been simply an artificial and temporary transformation caused by a great world emergency

<sup>1</sup> This issue appeared just after the outbreak of hostilities but dealt with shipping as it existed in June, 1914. Subsequent editions were censored until the present one of 1919-1920.

or are they, on the whole, in line with recent and present economic tendencies? Will the pre-war conditions with reference to the world's merchant marine be gradually restored or will the new situation develop in accordance with the transformation which has taken place since the outbreak of hostilities in 1914?

To answer these questions it will be necessary to treat at some length the shipping situation of the world as affected by the war and then discuss that situation in the light of industrial and commercial tendencies and conditions.

### *The Shipping Situation*

The shipping situation and the changes brought about by the war may be indicated by: (1) a tabulation of the number and tonnages of the vessels comprising the national mercantile marines of the leading commercial nations of the world in June, 1919; (2) a comparison of these tonnages with those of June, 1914; (3) a gauging of the gains and losses in the light of what would probably have been their growth had war not intervened; (4) a consideration of vessel depreciation and of the effects of changes in shipping routes during the war period; and (5) a discussion of the position of the merchant shipping of the United States.

1. The vessels included in the tabulation for June, 1919, are those of 100 gross tons<sup>2</sup> and over, and embrace all such vessels launched<sup>3</sup> and operating in every part of the world except those trading in the Caspian Sea, wooden ships operating on the Great Lakes of North America, and Japanese sailing vessels, none of which are recorded in *Lloyd's Register*.

2. In June, 1919, the world's mercantile marine, as recorded in *Lloyd's Register*, consisted of 29,255 vessels with an aggregate

<sup>2</sup> The gross ton and net ton, as applied to shipping, are space measurements. Gross tonnage represents the space within the hull and enclosed superstructures of a vessel measured in units of 100 cu. ft. Net tonnage is the same space using the same unit minus the space occupied by engines, boilers, crew quarters, etc., which are not available for traffic.

<sup>3</sup> *Lloyd's Register* records its vessels as soon as launched. The Bureau of Navigation does not document a vessel until it is ready for merchant traffic. Owing to the comparatively large number of vessels in the United States which have been launched but not documented and the former German tonnage which now flies the American flag but is not yet engaged in mercantile shipping the figures of Lloyd for American shipping in June, 1919, are larger than those of the Commissioner of Navigation. See *Annual Report* for 1919, pages 8 and 11.

TABLE 1.1—NUMBER AND GROSS TONNAGE<sup>2</sup> OF VESSELS, 100 TONS GROSS AND OVER, JUNE, 1919.

	Steam and motor vessels		Sailing vessels		Grand total	
	Number	Gross tonnage	Number	Gross tonnage	Number	Gross tonnage
<i>British</i>						
United Kingdom...	7,535	16,344,843	429	210,628	7,964	16,555,471
Dominions .....	1,610	1,863,365	531	189,039	2,141	2,052,404
Total .....	9,145	18,208,208	960	399,667	10,105	18,607,875
<i>United States</i>						
Sea .....	3,134	9,772,921	1,216	1,009,249	4,350	10,782,170
Northern Lakes <sup>3</sup> ...	477	2,159,694	29	98,092	506	2,257,786
Philippine Islands..	67	50,641	6	1,176	73	51,817
Total .....	3,678	11,983,256	1,251	1,108,517	4,929	13,091,773
Austria-Hungary ....	328	712,856	11	1,761	339	714,617
Denmark .....	446	631,331	199	71,105	645	702,436
France .....	1,099	1,961,753	341	271,878	1,440	2,233,631
Germany .....	1,543	3,247,253	225	256,127	1,768	3,503,380
Greece .....	205	290,793	107	33,003	312	323,796
Holland .....	870	1,573,720	61	18,191	931	1,591,911
Italy .....	523	1,237,844	335	132,253	858	1,370,097
Japan .....	1,418	2,325,266	<sup>4</sup>	<sup>4</sup>	1,418	2,325,266
Norway .....	1,433	1,597,299	196	260,530	1,629	1,857,829
Spain .....	486	709,095	90	41,516	576	750,611
Sweden .....	1,033	916,627	230	75,984	1,263	992,611
Other countries.....	2,179	2,502,106	863	351,334	3,042	2,853,440
Total .....	24,386	47,897,407	4,869	3,021,866	29,255	50,919,273

<sup>1</sup> Based upon table 1, page 960 of vol. 2, of *Lloyd's Register of Shipping*, 1919-20.

<sup>2</sup> In earlier editions of *Lloyd's Register* gross tonnage of steamers only was given. Sailing vessels were measured in net tons. In computing total tonnages of both kinds of vessels the gross tonnage of steamers and net tonnage of sailing ships were added together. In the current edition sailing vessels are given in gross tonnage.

<sup>3</sup> Wooden vessels not included.

<sup>4</sup> Japanese sailing vessels not recorded.

gross tonnage of 50,919,273. Sailing vessels constituted about one sixth of the total number, but less than one sixteenth of the aggregate tonnage. In June, 1914, the world's shipping comprised 30,836 vessels with a combined tonnage, gross and net,<sup>4</sup> of 49,089,552. Of these totals 24,444 were steamers with an aggregate gross tonnage of 45,403,877, and 6,392 were sailing ships with a total of 3,685,675 net tons.<sup>5</sup> As the net tonnage of sailing

<sup>4</sup> Gross tonnage of steamers and net tonnage of sailing vessels.

<sup>5</sup> *Lloyd's Register of Shipping*, 1914-15, volume 2, tables I and II, pages 960-961.

vessels in 1914 was approximately equivalent to 4,050,000 gross tons, the world's mercantile marine operated by steam or motor power increased during our five-year period approximately 2,500,000 gross tons, while that of sailing vessels declined over 1,000,000 gross tons.<sup>6</sup>

The redistribution of vessel tonnage during the period named is one of the most significant effects of the world war and can be well indicated by tabulating in round numbers the steam tonnages of the leading commercial nations of the world for June, 1914, and June, 1919, and noting the gains and losses of each, as follows:

TABLE 2.—STEAM TONNAGE, JUNE, 1914, AND JUNE, 1919, (EMBRACING STEAMERS OF 100 GROSS TONS AND OVER).

	June, 1914	June, 1919	Difference between 1914 and 1919	
	Tons (gross)	Tons (gross)	Tons (gross)	Percentage
United Kingdom...	18,892,000	16,345,000	—2,547,000	— 13.5
British Dominions..	1,632,000	1,863,000	+ 231,000	+ 14.1
United States: <sup>1</sup>				
Seagoing .....	2,027,000	9,773,000	+7,746,000	+382.1
Great Lakes.....	2,260,000	2,160,000	— 100,000	— 4.4
Austria-Hungary ..	1,052,000	713,000	— 339,000	— 32.2
Denmark .....	770,000	631,000	— 139,000	— 18.1
France .....	1,922,000	1,962,000	— 40,000	— 2.1
Germany .....	5,135,000	3,247,000	—1,888,000	— 36.8
Greece .....	821,000	291,000	— 530,000	— 64.6
Holland .....	1,472,000	1,574,000	+ 102,000	+ 6.9
Italy .....	1,430,000	1,238,000	— 192,000	— 13.4
Japan .....	1,708,000	2,325,000	+ 617,000	+ 36.1
Norway .....	1,957,000	1,597,000	— 360,000	— 18.4
Spain .....	884,000	709,000	— 175,000	— 19.8
Sweden .....	1,015,000	917,000	— 98,000	— 9.7
Other countries....	2,427,000	2,552,000	+ 125,000	+ 5.2
Total .....	45,404,000	47,897,000	+2,493,000	+ 5.5

<sup>1</sup> Steamers documented in the Philippine Islands are here included among those in "other countries" although properly American. See table 1 above, and *Lloyd's Register* for 1914-1915, vol. II, p. 960.

One of the most striking features of a comparison of the 1914 and 1919 figures is the relative position of the United Kingdom

<sup>6</sup> In the *Annual Report of the Commissioner of Navigation for the Fiscal Year ended June 30, 1919*, the sail tonnage for June, 1919, is treated as net rather than gross tonnage making the loss for the five-year period 664,000 net tons instead of over 1,000,000 gross tons (p. 11). See, however, volume 2, pages 960, of *Lloyd's Register* for 1919 and 1920, and compare with corresponding tables of earlier editions.

and the United States. In 1914, 41.6 per cent of the world's steam tonnage was registered in the United Kingdom, and 9.4 per cent in the United States, of which only about 4.5 per cent was sea-going. The present figures are United Kingdom 34.1 per cent and the United States 24.9 per cent, of which 20.4 per cent is sea-going tonnage.<sup>7</sup> From June, 1914, to June, 1919, the shipping of the United Kingdom operated by steam or motor power had declined 2,547,000 gross tons, or 13.5 per cent, while that of the United States had increased 7,646,000 gross tons, or 178.2 per cent. The increase for sea-going craft was 7,746,000 gross tons, or 382.1 per cent.

Next to the United Kingdom, Germany suffered the heaviest loss measured in tons, and its relative loss was greater than that of the island kingdom. In the decade prior to the war, Germany's mercantile marine was increasing rapidly, having added to its steam tonnage between 1900 and 1914 about 2,800,000 gross tons.<sup>8</sup> This addition, while less than half that of the United Kingdom for the same period, represented a much greater proportional growth. Notwithstanding this relatively rapid development in the fourteen years antedating the war, the German steam tonnage in June, 1914, amounted to only 5,135,000 gross tons, and the decline of 1,888,000 gross tons during our five-year period—a loss which is likely to be increased rather than diminished in the immediate future—indicates a serious setback for one of the largest and most rapidly growing mercantile fleets of the pre-war period.<sup>9</sup>

Japan, which in 1914 occupied sixth place among the nations in mercantile tonnage, now ranks fourth, having exchanged places with Norway. Next to the United States, Japan emerged from

<sup>7</sup> Not all of this tonnage is registered for foreign trade. In June, 1919, according to figures published by the Bureau of Navigation, Department of Commerce, the registered tonnage—i.e., the tonnage engaged in foreign trade—amounted to 6,669,726 gross tons, the bulk of which was steam. In the United States the tonnage engaged in domestic trade is known as enrolled or licensed rather than registered. See *Annual Report of the Commissioner of Navigation for 1919*, page 8.

<sup>8</sup> Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 96, 1919, p. 107.

<sup>9</sup> The steam tonnage of the United Kingdom in 1900 in round numbers was 12,000,000 and that of Germany about 2,300,000. The addition of 6,900,000 gross tons to the steam mercantile fleet of the former country means about 58 per cent increase, while the addition of 2,800,000 gross tons to the German merchant marine represented a growth of 120 per cent.

the war with the largest absolute and relative increase in its shipping of any country in the world. This increase is small compared with that of the United States, but amid the smaller gains and heavy losses of most other commercial nations the growth is noteworthy. Japan was in a position to profit by the urgent demand for shipping on the Pacific after the outbreak of hostilities in 1914<sup>10</sup> and the internment and withdrawal from trade for war purposes of a large part of the mercantile marine of the belligerent countries—particularly vessels engaged in commerce in the Orient and on the Pacific.<sup>11</sup>

3. The world's shipping in the years immediately preceding the war was growing rapidly, due partly to trade development, and partly to a spirit of rivalry among the leading commercial countries to have a mercantile marine consonant with their supposed commercial and political importance. This growth was seriously affected by the war, and must be taken account of in any attempt to describe the shipping situation as it was shaped by the crisis through which the world has just passed. Several attempts, particularly in England, have been made to gauge war losses and gains on the basis of an assumed normal growth. Diagrams illustrating the net losses and gains to the mercantile marines of the world have been drawn and published showing more vividly than bare figures the changes wrought during the years of the great struggle.<sup>12</sup>

Estimates of this character always contain elements of uncertainty; and as applied to pre-war shipping conditions when some of the largest line companies were either in the hands of receivers or near the verge of bankruptcy,<sup>13</sup> they have to be made with a

<sup>10</sup> See "The War and Trans-Pacific Shipping," in *AMERICAN ECONOMIC REVIEW*, vol. 7 (Sept., 1917), p. 553.

<sup>11</sup> Some interesting examples of the curtailment of the Oriental services on the part of British line companies are given in *Miscel. Series No. 96*, pp. 105-113.

<sup>12</sup> See *Annual Report of the Chamber of Shipping of the United Kingdom for 1918-19*.

<sup>13</sup> The International Mercantile Marine defaulted in the payment of interest on its 4½ per cent bonds on October 1, 1914, following a long period of depression. On February 1, 1915, it defaulted in the payment of interest due on the International Navigation Company 5 per cent bonds. The progress of the war, however, brought this combination a prosperity not hitherto enjoyed. The International Mercantile Marine controls the companies operating the American Line, the Red Star Line, White Star Line, Atlantic Transport Line, Dominion Line, and Leyland Line.

great deal of reserve. However, no discussion of the effect of the war is adequate without some attempt to measure its influence on the general growth of shipping. A careful estimate of losses and gains was recently made upon the following assumptions, based upon *Lloyd's Register*, of what the world steam tonnage would have been had there been no war.<sup>14</sup>

a. It is reasonable to expect that the percentage of addition to the world's tonnage would have continued at the ratio (a decreasing one) recorded during the last fifteen pre-war years and that the percentage of the tonnage of the United Kingdom to that of the world would show approximately the same ratio of decrease recorded during the most recent of these years.

b. Countries in which there has been a large addition of tonnage during the previous quinquennial period might be expected to show a reduction in the ratio of increase, and, generally speaking, the larger the previous increase the larger would be such reduction.

c. Allowances should be made in the special cases of countries where pre-war conditions pointed to the acquisition of tonnage, in the near future, at a higher ratio than what had actually been recorded during the previous period.

The effect of the war, according to these assumptions, is shown in the following differences between the actual figures for 1919 and the estimates made of what the present steam tonnages would have been if no war had taken place:

TABLE 3.—LOSSES AND GAINS OF THE WORLD'S MERCHANT STEAM TONNAGE AS A RESULT OF WAR UNDER CERTAIN ASSUMPTIONS OF NORMAL GROWTH.

<i>Country</i>	<i>Gross tons</i>
United Kingdom .....	—5,003,000
British Dominions .....	— 139,000
Total British .....	—5,202,000
United States (Sea).....	+7,168,000
United States (Great Lakes).....	— 439,000
Total American .....	+6,729,000
France .....	— 536,000
Germany .....	—3,582,000
Holland .....	— 384,000
Italy .....	— 677,000
Japan .....	+ 20,000
Norway .....	—1,025,000
Other countries .....	—2,816,000
Grand total .....	—7,473,000

Summarizing these totals it would appear that the net result of

<sup>14</sup> *Board of Trade Journal* (London), Aug. 7, 1919, pp. 172-3.



the war on the world's merchant steam tonnage was a loss of 7,473,000 gross tons. By far the largest loss was incurred by the United Kingdom, whose steam fleet is probably now over 5,000,000 gross tons less than it would have been but for the war. Germany's loss of 3,582,000 gross tons was relatively heavier than that of the United Kingdom and will probably show an increase over this estimate when final figures are available. Norway, according to these estimates, suffered to the extent of 1,025,000 gross tons. With France and Japan close rivals in the respective growths of their mercantile marines shortly before the war the losses of Norway served to reduce her from the fourth to the sixth rank among the merchant fleets of the world.<sup>15</sup>

Aside from the United States the only country among those enumerated showing any gain beyond the estimated normal rate of growth was Japan, and this gain was figured at only 20,000 gross tons. The aggregate loss suffered by the foreign mercantile marine (steam) as a result of the war, was approximately 14,202,000 gross tons. The large net gain of the United States of 6,729,000 gross tons served to reduce the loss for the world as a whole to 7,473,000 gross tons.

4. Another loss sustained by the world's shipping as a result of the war, which does not, however, appear in figures of tonnages, has been the decline in efficiency. Quite apart from additions to the merchant fleets of the world before the war, replacements of vessels, lost or broken up, amounted each year to about 11½ per cent of the total tonnage owned. During the war this percentage was greatly increased in order to repair the damages inflicted by submarine activities and the loss felt by the requisitioning of a large part of the mercantile fleets of the belligerent nations for war service. A considerable tonnage, however, has been kept in existence and in active operation which under ordinary conditions would have been broken up and replaced by more modern and more economical vessels. Ships which were at all seaworthy doubled, trebled, and even quadrupled in value as the war progressed.<sup>16</sup>

<sup>15</sup> In June, 1914, the steam tonnage of these three countries as recorded in *Lloyd's Register* was as follows: Norway, 1,957,353 gross tons; France, 1,922,286 gross tons; and Japan 1,708,386 gross tons. Norway's sail tonnage was 547,369 net tons against France's 397,152 net tons. In June, 1919, the steam tonnages of Norway, France, and Japan, as shown in Table 1, were 1,597,299, 1,961,753, and 2,325,266 respectively.

<sup>16</sup> In August, 1919, the following steamship sales were reported: The Sunderland steamer, "Calonne," 4,019 tons, built in 1899, price \$1,000,000; the

Old vessels practically consigned to the scrap heap were hastily repaired and employed in domestic or inland trade to take the place of better ones which had been transferred to foreign or transoceanic services.

These observations are probably more applicable to the United Kingdom than to other countries. During the years 1911-1913 about two million tons of steamers were sold by Great Britain to other countries,<sup>17</sup> and, of course, replaced by better vessels equipped with all the latest marine devices. In addition, the British mercantile fleet increased each year half a million tons or more. After the outbreak of war growth stopped. Up to the middle of 1916 the losses suffered by the British merchant fleet, however, were approximately covered by new construction, purchases abroad, and the acquisition of enemy vessels.<sup>18</sup> After the middle of 1916 losses greatly exceeded accretions and, in the fateful spring months of 1917, became so great as to threaten the collapse of the Entente.<sup>19</sup> During the latter part of the war the United Kingdom secured by agreement and charter a considerable amount of Dutch, Norwegian, Danish, Swedish and other tonnage for temporary use, and thus controlled, notwithstanding her heavy losses, a larger percentage of the world's shipping than before the war.

The drain upon British shipping is indicated by the magnitude of the losses officially reported near the end of the war and the greatly reduced sales of English tonnage to other countries. The total losses from belligerent action and marine risk, according to a statement by the British Admiralty, amounted to 9,031,828 gross tons from the beginning of the war to October 31, 1918.<sup>20</sup> Over two thirds of this tonnage was the result of submarine activities. New construction in the United Kingdom during the same period was 4,342,295 tons, purchases abroad were 530,000 tons, and enemy vessels captured amounted to 716,520 tons. Dur-

West Hartlepool steamer "Arachne," 3,898 tons, built in 1912, price \$800,000; and the London steamer "Thysa" 2,426 tons, price \$425,000. The first of these vessels changed hands in 1915 at a price of \$343,750, which at the time was regarded high. See *Morning Post* (London), August 18, 1919.

<sup>17</sup> *Board of Trade Journal* (London), Aug. 7, 1919, p. 173.

<sup>18</sup> *Lloyd's Register of Shipping*; and Miscel. Series, No. 96, pp. 105-6.

<sup>19</sup> The seriousness of the situation has recently been revealed by Admiral Sims in his articles discussing America's contributions to the anti-submarine warfare. See the October numbers of *Washington Sunday Star*.

<sup>20</sup> Miscel. Series No. 96, 1919, p. 109.

ing the years 1916-1918 probably less than 100,000 tons of steamers were sold to other countries to make way for newer or more modern craft.<sup>21</sup> When it is remembered that many of the newly constructed vessels were hastily built—to a considerable extent constituted an emergency equipment—it will be appreciated that the loss sustained by the merchant shipping of Great Britain and of European countries generally cannot be gauged by the mere difference between present tonnage figures and estimates of what those figures would have been under normal conditions.<sup>22</sup> A very serious effect of the war upon the world's mercantile marine was a marked deterioration. For many years to come a larger percentage of the total shipping of the world will have to be replaced than in the pre-war period in order gradually to restore this tonnage to its earlier efficiency. This need is appreciated in Great Britain, as can be seen from the fact that the tonnage under construction in British yards at the end of June, 1919, was 2,524,050 tons—269,000 tons greater than in March and 709,000 tons more than a year before, when the war pressure upon man power was at its highest.<sup>23</sup>

There is another aspect, however, of the efficiency situation which must qualify to some extent what has been said concerning deterioration. In the construction program of the nations most seriously affected by war losses, efforts were made to build ships of large size and as far as possible to use steel in their construction. In the United Kingdom, for example, of the merchant craft launched in the year 1918 the average vessel tonnage was 4,478, or 1,655 tons more than in 1913.<sup>24</sup> This increase in average size was due in part to the necessity of replacing ocean-going vessels destroyed by submarine attacks, which on the whole were ships of moderate or large size. Nevertheless there was some agitation for the construction of a great number of small vessels which would not be such easy targets for submarines. According to a report by the Departmental Committee on Shipping and Shipbuilding after the War, the secret of Great Britain's success in peace and of her danger in war is the large average size of her

<sup>21</sup> *Board of Trade Journal* (London), Aug. 7, 1919, p. 173.

<sup>22</sup> A writer for the *Board of Trade Journal* estimates the loss on account of deterioration of vessel equipment alone for the world generally at over 1,000,000 gross tons. This figure seems to the writer to be wholly inadequate.

<sup>23</sup> *The Economist* (London), Aug. 2, 1919, p. 187.

<sup>24</sup> Based upon figures in table 1 of volume 2 of *Lloyd's Register of Shipping*, 1919-1920, p. 960.

ocean-going steamers, because "vessels of large size are generally more economical than smaller vessels, but in war their loss is more severely felt proportionately as their number is limited." It was pointed out that 90 per cent of the steam tonnage of the United Kingdom consisted mainly of vessels of moderate or large size, that is, of 1,600 gross tons and over. More than 16,000,000 gross tons in 1914 were represented by only 3,747 steamers, or a little over one-third the total number, while the other 2½ million tons were represented by the remainder. In the case of Great Britain a large proportion of the mercantile tonnage continued to be represented by steamers of large size, and the world's mercantile fleet of 1919 shows an appreciable growth in the size of the average vessel during our five-year period.<sup>25</sup>

The percentage of steel tonnage remained high even where great difficulty was experienced in obtaining ship plate and structural shapes at reasonable prices. The resort to wood and composite was more marked in the United States where wooden merchant vessels are comparatively common. It was not characteristic of most European countries. Over 96 per cent of Great Britain's steam tonnage in 1919 was of steel construction.

The shortage of vessel equipment resulting from war activities produced certain effects of a temporary character to which reference should be made in this connection. Steamers of a high class, built for specialized trades such as meat and fruit requiring refrigerated spaces, were often transformed and used for other purposes. A considerable European tonnage of this character was taken off the routes to South America, Africa, and the Orient, while the corresponding service between the United States and western Europe remained intact and was to some extent increased. The shorter distance in this trans-Atlantic service made possible a greater economy in vessel space than would have been possible in the longer hauls between Europe and Asia, Africa and South America. The transformation of such specialized equipment will for a time handicap a trade which had developed in the pre-war period to considerable proportions and had been a factor in supplying Europe with an appreciable percentage of its perishable food supply.

Ships, too, of all kinds were withdrawn at times from distant trades in order to concentrate them on trades nearer home. The

<sup>25</sup> The steamers listed in Lloyd's in 1919 numbered 24,386, as against 24,444 in 1914, but the gross tonnage of the former was more than 2,500,000 greater.

British trade with India during the war was cut down by 50 per cent. The service to Australasia which in 1914 had been 24 or 25 steamers per month was gradually reduced to 5 per month by October, 1918.<sup>26</sup> This withdrawal of shipping from the East has led to the encroachment of Japanese liners, and one company whose sailings had been reduced from five to one per month has expressed fears of serious difficulty in the future on account of Oriental competition. One Japanese company took advantage of the need felt for Asiatic products in Europe and of certain American products in Asiatic Russia, China, and Japan to establish a round-the-world freight service.<sup>27</sup> The reestablishment of old trade routes is thus one of the problems of reconstruction for some of the mercantile marines of Europe.

5. Few effects of the war on international trade have excited more attention and comment than the rapid growth of the shipping of the United States. Prior to the war the aggregate gross tonnage of merchant vessels documented in American ports was sufficiently large to make the mercantile fleet of the United States one of the largest in the world. In 1914 this fleet, as recorded in Lloyd's, aggregated about 5,500,000 gross tons,<sup>28</sup> and was approximately the same size as that of Germany, but less than a third that of the United Kingdom. If river craft, small steam and motor boats, barges, and the like, which are not recorded in Lloyd's, were added, this tonnage would be increased to 7,928,688.<sup>29</sup>

The American mercantile marine, while large in tonnage, operated for the most part in the coastwise trade and on the Great Lakes, and exerted but little influence on international commerce. Of the above-named total only 1,076,152 gross tons operated in the foreign trade, and of this registered tonnage only 720,609 represented steam vessels—the balance being composed of bulk-carrying sailing ships and whale-fishing boats.<sup>30</sup> Nearly 40 per cent of the entire American fleet was enrolled in ports on the Great

<sup>26</sup> Miscel. Series, No. 96, 1919, p. 110.

<sup>27</sup> This company was the Nippon Yusen Kaisha.

<sup>28</sup> Steamers 4,330,078 gross ton plus sailing vessels 1,038,116 net tons or 5,368,194 tons, gross and net. In the case of sailing vessels the difference between gross and net tons is not so great as in the case of steamers.

<sup>29</sup> *Annual Report of Commissioner of Navigation*, 1919, p. 10.

<sup>30</sup> *Ibid.* and *Statistical Abstract of the United States*, 1918, pp. 353-4 and 824.

Lakes, and over 50 per cent of the steam tonnage recorded in Lloyd's.

The tonnage engaged in foreign trade was not only relatively small, but represented a marked decline from the days of the clipper sailing vessel when about a third of the world's ocean freight was carried in ships flying the American flag. A comparison of the American vessel tonnage operating in the domestic and foreign trade in the decade before the Civil War and in decennial years after that struggle up to 1914 will show the general course of its development since that period:

TABLE 4.—AMERICAN TONNAGE ENGAGED IN FOREIGN AND DOMESTIC TRADE.<sup>1</sup>

Year	Engaged in foreign trade and whale fisheries <sup>2</sup>	Engaged in domestic or coastwise trade and mackerel fisheries	Engaged in commerce on the Great Lakes <sup>3</sup>
	(Gross tons)	(Gross tons)	(Gross tons)
1850	1,585,711	1,949,743	198,266
1855	2,535,206	2,676,795	362,655
1860	2,546,237	2,807,631	467,774
1870	1,516,800	2,729,707	684,704
1880	1,352,810	2,715,224	605,102
1890	946,695	3,477,802	1,063,063
1900	826,694	4,338,145	1,565,587
1910	791,825	6,716,257	2,895,102
1914	1,076,152	6,845,063	2,882,922

<sup>1</sup> *Statistical Abstract*, 1918, p. 824.

<sup>2</sup> The tonnage engaged in the whale fisheries is a negligible fraction of the registered tonnage. In recent years about 70 to 75 per cent of the American fleet operating in the foreign trade consisted of steamers and the bulk of the remainder of bulk carrying sailing vessels.

<sup>3</sup> This tonnage is included in the figures for the domestic or coastwise trade, but is tabulated here to show the increasing importance of the Great Lakes fleet up to the outbreak of the World War.

Sixty years ago, about half of the American shipping was engaged in the foreign trade. In 1910 less than one eighth was so engaged, and in 1914 a little over one eighth. From the founding of this republic to the Civil War, over half of our imports and exports going by sea were carried in American vessels, while in 1914 less than one tenth were so transported.<sup>31</sup>

From 1914 to 1919 there was a rapid growth in the sea-going

<sup>31</sup> In the fiscal year ending June 30, 1914, 11.4 per cent of the imports and 8.3 per cent of the exports going by sea were carried in vessels of American registry (*Statistical Abstract*, 1918, pp. 802-803). Just before the Embargo of 1807, over 90 per cent of our foreign trade was carried in vessels flying the American flag.

fleet of the United States, a growth which began before this country entered the war on the side of the Entente. By June 30, 1916, the registered gross tonnage had more than doubled, and by June 30, 1919, had increased to 6,669,726,<sup>32</sup> or more than six times what it was five years before. Sea-going ships, recorded in Lloyd's, which operate in either the domestic or foreign trade, increased from 2,970,284 to 10,782,170 gross tons. The American fleet trading on the Great Lakes showed a slight decline during the war partly because of the greater demand for vessel space in the ocean trade and the transfer of a considerable tonnage from the Great Lakes to the ocean.<sup>33</sup> Adding the Lake fleet to the sea-going vessels the American mercantile marine in June, 1919, aggregated over 13,000,000 gross tons, or nearly four fifths that of the United Kingdom. Half of this tonnage was employed in the foreign trade.

The rapidity of this change in the shipping situation was a result of war conditions combined with a governmental policy encouraging and finally engaging in the building up of an American mercantile marine. In the words of the Commissioner of Navigation this policy developed as follows:<sup>34</sup>

The first year of the European war established in the United States the policy of "free ships," or the admission of foreign-built ships to American registry, for the foreign trade. The second year, ended in the summer of 1916, was a period of uncertainty; and the third year, ended in the summer of 1917, was marked by the growth of our ship-building industry under the spur of unrestricted submarine warfare. The fourth year has been characterized by the establishment in principle and gradually through the year in practice of direction by the Government of the operation of practically all our sea-going tonnage, structurally capable of engaging in foreign trade, and by the vote by Congress of vast sums to build trading ships for the Government and to aid in constructing and operating ship yards.

The evolution of this governmental policy has played its part in making the American merchant marine an important factor in the commerce of the world, as it was in the days before the Civil War. It now ranks next to that of the United Kingdom and is

<sup>32</sup> See *Annual Report of the Commissioner of Navigation*, which contains the shipping statistics for 1919, page 8.

<sup>33</sup> The *Commerce Monthly* (issued by the National Bank of Commerce in New York) September, 1919, page 12, gives this transfer as amounting to 139,469 gross tons.

<sup>34</sup> *Annual Report of the Commissioner of Navigation to the Secretary of Commerce for the Fiscal Year ended June 30, 1918*, p. 10.

not far below it. Its aggregate gross tonnage is between three and four times that of Germany, whose mercantile fleet, as at present rated by Lloyd's, ranks third among those of the world. With prospective completion of the government's war shipbuilding program by December 31, 1920, the United States with its registered and enrolled<sup>35</sup> vessels will have a merchant fleet of about 18,000,000 gross tons.<sup>36</sup> With the present rate of growth in British shipping this tonnage will approximately equal that of the United Kingdom, and the two nations will control about two thirds of the world's shipping.

This brilliant showing which the mercantile fleet of the United States has made since 1914 is not without some dark aspects. Many of the vessels—particularly those built shortly after the United States entered the war—were crudely constructed. Speed rather than careful construction was the great desideratum, and this fact coupled with comparative inexperience led to the building of many ships whose usefulness is likely to be of short duration.

The proportion of wooden tonnage is larger than that of other prominent fleets. Among American sea-going steamers recorded in Lloyd's for 1919 nearly 1,400,000 gross tons represents wooden vessels, while the corresponding tonnage of Great Britain's larger fleet is less than 80,000. The average size of the American vessel is moderate and increasing. The United States, however, has not as yet an adequate number of large size vessels considering its geographical position. A comparison of the number of sea-going ships of 2,000 tons and upwards of the United Kingdom and the United States shows a marked difference between the two countries now having the largest mercantile marines.

SEA-GOING VESSELS OF 2,000 GROSS TONS AND UPWARDS.

	2,000 and under 4,000 gross tons	4,000 and under 8,000 gross tons	8,000 gross tons and over
United States ....	1,272	811	90
United Kingdom .	1,042	1,485	263

The trans-Atlantic and trans-Pacific commerce of the United States call for large-size vessels. Much of the coastwise and West

<sup>35</sup> Enrolled tonnage signifies shipping engaged only in the domestic trade. It is distinguished from registered tonnage which is employed in foreign commerce.

<sup>36</sup> *Washington Evening Star*, Nov. 3, 1919, p. 7.



Indies trade can be more economically handled by steamers of over 4,000 gross tons than by smaller craft. In Europe there is an immense volume of ocean freight which is carried short distances and often between ports located on inlets and rivers for which vessels of light draft are alone suitable and which reduce transshipment costs. Except along the north Atlantic coast such freight movements in the United States are relatively limited.

### *Shipping and Industrial and Commercial Tendencies*

The significance of the changes above described, particularly with reference to their bearing upon the probable permanence of the redistribution of tonnage among the commercial nations of the world, can only be understood in the light of economic conditions. Political policy may encourage or hamper the development of a national mercantile marine, but fundamental growth will be determined by natural resources and industrial technique. The generous subsidies of France to shipbuilders and shipowners did not enable that country during the pre-war period to overcome the handicaps of a relatively limited supply of coal and the high price of steel, while the comparative abundance and cheapness of these products in Great Britain and Germany were important factors in the growth and strength of the shipping of these two countries. The prominence of the American mercantile marine in the days before the Civil War was closely connected with the cheapness and accessibility at tidewater of wood on this continent. Its decline during and after the Civil War was very largely due to the gradual substitution of steam for sailing vessels in ocean navigation,<sup>37</sup> and of iron, and later of steel,<sup>38</sup> for wood as material in their construction. Until near the close of the nineteenth century coal, iron, and steel were more expensive in the United States than in England, and hence shipbuilding and ship operation became less attractive fields for American capital than they had been in earlier periods.

To say this, however, does not imply that, during a period of

<sup>37</sup> It will be remembered that steam power was not extensively used in ocean navigation until after the middle of the nineteenth century. The early steamboats of the United States were used mainly on rivers and lakes.

<sup>38</sup> Exempting shipbuilding material from the payment of tariff duties gave no real assistance to the shipbuilder in the United States as the cost of transporting foreign material to the United States added materially to the expense of building in American shipyards.

readjustment like the present, political policy is a very minor factor in determining shipping conditions or even in shaping future possibilities. In the United States, for example, we have the phenomenon of a great mercantile marine developed overnight, so to speak, largely built and owned by the government. And yet for more than a generation there has been in this country no considerable seafaring population whose life, traditions, and inclinations are bound up in the sea. The present policy of the United States Shipping Board is to establish this fleet as a permanent American merchant marine—preferably under private management but at all events operating under the American flag.<sup>39</sup> One of the tasks of the Shipping Board is thus to develop, or rather re-develop, marine activities and interest among a people which for several decades has been devoted almost exclusively to land pursuits. The wisdom and success of this policy depend mainly upon the economics of the shipping situation.

The economic factors in this situation are many and involved. The very important ones of the cost of shipbuilding material, fuel, and labor, both of construction and operation, have received considerable attention in the press and in public discussion, but they are only a few of a large number of potent, though often rather intangible, elements determining the growth and success of a national mercantile marine. There is, for example, the obvious factor of traffic possibilities both on outbound and inbound voyages, and there is also the less tangible, but by no means negligible, one of the psychological effect of regular sailings upon the growth of commerce, an influence which the Germans made use of in the development of their South American and Oriental trade in the pre-war period.<sup>40</sup> The shipping situation today, however, is too uncertain to allow of making any close estimate of shipbuilding and ship-operating costs in the leading commercial countries of the world and gauging the traffic possibilities of their several merchant fleets. Some discussion, however, of recent industrial

<sup>39</sup> See statement of John Barton Payne, chairman of the U. S. Shipping Board, to the Southern Commercial Congress, Savannah, Ga., Dec. 8, 1919.

<sup>40</sup> The greater part of the ocean trade of the world is carried in tramp vessels, *i.e.*, vessels with no regular sailings and no definite routes. In 1913 about 60 or 65 per cent of the traffic carried in British vessels was tramp traffic. The Germans, however, appreciated the importance of line traffic, *i.e.*, trade carried in vessels with established routes and regular sailings, and about 85 or 90 per cent of the ocean trade of the German mercantile fleet before the war was carried in liners.

and commercial tendencies, especially in the two countries now having the largest merchant fleets of the world, will help to throw light upon the economic factors in the shipping situation.

In 1914 about 40 per cent of the world's sea-going tonnage was of British registry. The capacity of British shipyards was greater than that of all foreign shipyards put together. The annual output, not including that of the Admiralty dockyards, had a gross selling value of approximately \$250,000,000.<sup>41</sup> This supremacy of the British shipbuilding industry is today challenged by that of the United States. American vessel tonnage, as has already been indicated, is still considerably less than that of the United Kingdom, but the great impetus given to shipbuilding during the war has resulted in the development of shipyards in this country whose capacity is much greater than that of British plants. In June, 1919, the tonnage under construction in the shipyards of the world amounted to 8,017,767. Less than one third was in British yards while the bulk of the remainder was in American plants.<sup>42</sup> The sudden and enormous expansion of shipbuilding in the United States was, of course, an effect of a governmental policy adopted to meet a great emergency. Before the war, however, shipbuilding outside of the United Kingdom was becoming relatively more important. This may be illustrated by the annual launchings of merchant vessels in the British Empire and in other countries from 1892 to 1914, as follows:<sup>43</sup>

TABLE 5.—GROSS TONNAGE OF MERCHANT VESSELS LAUNCHED IN THE BRITISH EMPIRE AND IN FOREIGN COUNTRIES (ANNUAL AVERAGES).

Period	British Empire		Other countries	Total	Percentage of British output to total
	United Kingdom	Oversea Dominions			
1892-94	998,000	10,000	238,000	1,236,000	81.6
1895-99	1,170,000	14,000	457,000	1,641,000	72.8
1900-04	1,358,000	27,000	953,000	2,348,000	59.9
1905-09	1,396,000	25,000	934,000	2,355,000	61.0
1910-14	1,660,000	35,000	1,079,000	2,774,000	61.9

During the fifteen years immediately preceding the war there had grown up considerable competition between British and other shipbuilders for foreign orders. It was not usual for English

<sup>41</sup> Based upon statement in Miscellaneous Series, No. 96, p. 105.

<sup>42</sup> From figures given in *The Economist* (London), Aug. 2, 1919, p. 187.

<sup>43</sup> Based upon the figures for annual launchings in the statistical tables of vol. 2 of *Lloyd's Register*.

vessel-owners to obtain their ships from abroad, although some of them had begun to place contracts on the Continent. At one time British shipbuilders delivered many vessels to German owners, but by 1914 this trade had practically ceased. Italy was placing substantial orders in Great Britain before the war began, but was nevertheless increasing its own output of vessels. Japan, at one time a large buyer, had become a seller of ships.<sup>44</sup> Shipbuilding in other countries had thus begun to threaten the position of the United Kingdom, although over 60 per cent of the world's tonnage launched was still British.

After the outbreak of war the proportionate launchings of British vessels declined rapidly. In 1916 out of an estimated total of 1,688,080 gross tons, 608,285 gross tons were launched in the United Kingdom, and in 1918 the figures were 5,447,444 gross tons for the world and only 1,348,120 gross tons for Great Britain.<sup>45</sup> While it is entirely probable that Great Britain's share of the world's shipbuilding will increase in the next few years, it is doubtful if her position will be as predominant as in the pre-war period, and it is far from certain that such predominance would have continued very long even if war had not intervened.

During the two decades immediately preceding the war there had been a similar slow decline in the proportion of the world's operating vessel tonnage registered in the United Kingdom. This decline may be indicated as follows:

TABLE 6.—VESSEL TONNAGE REGISTERED IN THE UNITED KINGDOM COMPARED WITH THE TOTAL TONNAGE OF THE WORLD.<sup>46</sup>

Year	United Kingdom	World	Per cent of the United Kingdom
1890	10,241,856	22,151,651	46.2
1895	12,117,957	25,107,632	48.3
1900	13,241,446	29,043,728	45.6
1905	15,803,180	36,000,893	43.9
1910	17,516,479	41,914,765	41.3
1914	19,256,766	49,089,552	39.2

This lessening proportion of the world's merchant marine registered in the Kingdom was, of course, due to increased marine activities on the part of other commercial countries rather than to

<sup>44</sup> Miscel. Series, No. 96, p. 11.

<sup>45</sup> *Lloyd's Register*, 1919-1920, vol. 2, p. 966.

<sup>46</sup> Figures from *Lloyd's Register*. Figures include both the gross tonnage of steam vessels and net tonnage of sailing vessels.

any diminution of shipping interest in Great Britain. The industrial development of Germany coupled with the exploitation of her coal and iron-ore resources, the political and economic relations of France to an enlarging colonial empire, the geographical position of Norway and the increasing commercial activities of Japan all contributed to the interest which these countries were manifesting in the growth of their own shipping. The merchant fleets of these countries were far behind those of the United Kingdom; but the fact nevertheless remains that during the last two decades of the pre-war period British control of the ocean-carrying trade of the world was becoming less pronounced and might in time be challenged by rival nations.

Tendencies which could be interpreted as a forecast of the wonderful growth of the American mercantile marine during the past five years are not so clearly discernible in the decade or two immediately preceding the outbreak of hostilities. Shipbuilding fluctuated greatly from year to year with no very pronounced disposition to increase.<sup>47</sup> Furthermore, domestic shipbuilding was subsidiary to a national mercantile marine, seven eighths of which was engaged in purely American trade, a trade reserved for the most part by law for vessels built and documented in the United States. This domestic shipping, however, was far from being unimportant, and as developed on the Great Lakes attained an efficiency in construction and operation unsurpassed anywhere else in the world.<sup>48</sup>

After the outbreak of hostilities in Europe, orders from foreign shipowners began to be placed in the United States. Shipyards were enlarged and building activities became pronounced as the demand for vessel tonnage increased. The great development of the American shipbuilding industry took place, of course, after the United States entered the war, with the results already indicated.

The growth of American vessel tonnage before the summer of 1914 could hardly be taken as any evidence that the American

<sup>47</sup> From 1900 to 1914 the tonnage constructed varied from 232,669 in 1912 to 614,216 in 1908. See reports of Commissioner of Navigation for 1918 and 1919.

<sup>48</sup> The character of trade on the Great Lakes differs in many respects from that on the ocean. A large part of the traffic consists of iron ore, and vessels are specially built for this kind of freight. The ore-carrier is an illustration of what American shipbuilders can do in the construction of specialized types of vessels.

mercantile marine was in the near future to play a big part in the world's commerce. American shipping was increasing with a fair degree of steadiness, but the part that showed the most conspicuous growth was the shipping which existed under the protection of laws that reserved the coastwise trade to vessels flying the American flag. Up to 1910 the registered tonnage showed no marked tendency to increase, and from the Civil War to the middle nineties displayed a pronounced disposition to decline. From 1910 to 1914, however, there was a steady and marked increase in the registered tonnage;<sup>49</sup> but the period is too short for drawing conclusions with reference to tendencies, especially in view of the fluctuations of earlier years.

During the period from 1914 to 1919 the United States increased its registered tonnage to more than six times what it was before the war. It must be said, however, that this development took place under war pressure and can hardly be characterized as a fulfilment of a forecast whose signs appeared in ante-bellum days.

Whatever importance may be attached to the pre-war tendencies in the United Kingdom and the United States above described, there are other factors whose significance for the shipping situation is worthy of note. Among these is the position of the iron and steel industry in the leading commercial nations of the world. Before the close of the nineteenth century the United States had displaced Great Britain as the leading steel-producing country of the world and not long after Germany took second place. France, which ranked fourth, was third in her output of iron ore; but, owing to the relative scarcity of coal, shipped much of her ore to foreign countries to be manufactured into iron and steel products. French steel designed for shipbuilding was comparatively expensive; the steel of the first three countries named was relatively cheap. Some German and English steel was exported to Norway, Sweden, and Holland for shipbuilding purposes. Japan had little iron ore, but by using Chinese material and importing steel from the United States at a high price, after paying a considerable transportation charge, she was able with her cheap labor to develop a fairly extensive shipbuilding industry. With the growth of the iron and steel industry in Germany,

<sup>49</sup> The figures for these years were as follows: 1910, 791,825 gross tons; 1911, 872,671 gross tons; 1912, 932,101 gross tons; 1913, 1,027,776 gross tons; and 1914, 1,076,152 gross tons.

that country built extensive shipyards, and before the outbreak of war had the second largest merchant marine engaged in international trade, the vessels of which were constructed for the most part in German shipyards.

In the United States, shipbuilding activity, as has already been shown, exhibited no growth comparable with the enormous development of its iron and steel industry. One reason for this difference was the fact that the iron and steel center of the United States is located much further from tidewater than the corresponding centers of England and Germany. A more potent factor was the lack of standardization. The American vessel exhibited great individuality, whereas the United States is a country which produces cheaply only when she produces in large quantities ("mass production"). This drawback, however, was being overcome, especially in the building of bulk-carrying vessels on the Great Lakes and on the Atlantic coast, in the decade immediately preceding the war.<sup>50</sup>

Notwithstanding the comparative backwardness of shipbuilding activity, shipbuilding material in the United States had become as cheap as in any other part of the world. In 1913 and 1914 the quoted prices on ship-plate were as low in this country as in England, and on structural shapes, appreciably lower.<sup>51</sup> Since 1914 the prices of steel material used in ship construction have apparently increased faster in Great Britain than in the United States. While price comparisons between this and other countries have to be made with considerable reserve in view of the falling and uncertain rates of foreign exchange, they are, however, of some significance. During the first eight months of 1919 the home<sup>52</sup> prices

<sup>50</sup> Individuality must not be confused with specialization. The ore-carrier of the Great Lakes, the coal-boat of the North Atlantic coast, and the tank vessel of the Atlantic and Pacific coasts are highly specialized types. They are, however, largely standardized. Ships designed for general cargoes and passenger boats often showed considerable variation in type, and their building was often expensive on account of the particular adaptation of shipyard equipment to their construction.

<sup>51</sup> Quotations on tank and ship plates, Pittsburgh, averaged about \$33.60 per gross ton for the year 1913. They were approximately the same in England. Structural shapes averaged \$33.60 per gross ton at Pittsburgh and \$37.73 per gross ton in England (Midlands). See price quotations in *Iron Age and Iron and Coal Trades Review* (London).

<sup>52</sup> Under the British price-fixing policy during the war, home prices were kept appreciably lower than export prices. A system of drawbacks on exports regulated the export trade.

of English structural shapes averaged \$75.96 per gross ton, while the corresponding average for the American product at Pittsburgh was \$57.54 per gross ton. In July, 1919, ship-plate was selling in England at \$92.46 (£19) per gross ton while at tide-water in the eastern United States the price was \$68.13.<sup>53</sup> Making due allowance for the low rate of foreign exchange on the pound sterling during the summer of 1919, the differences between English and American prices were considerable. It is, of course, probable that these differences will be gradually reduced with the establishment of more settled industrial conditions. Nevertheless they reveal a condition which favors the American shipbuilder in his competitive efforts to secure material for construction.

The present immense shipbuilding activity of the United States, surpassing that of any other country in the world, is mainly an outcome of the war, and, so far as shipping is concerned, is its most conspicuous effect. The materials are comparatively cheap, but how about ships? Is this war-time industry simply a transitory phase of our economic history, destined to be reduced to its pre-war proportions, or is it a growth in line with our industrial development to which the war simply gave a powerful stimulus?

The present disorganization of the world's industries and the uncertainties of trade make any categorical answer to these questions impossible. There are, nevertheless, some signs that the general character and trend of industrial conditions bid fair to make permanent, or at least favor, the changes which have taken place in the shipbuilding activities of the United States. It has been contended on the part of both American and foreign ship-owners that it is useless to place orders in the United States for ships, as prices are exorbitant. Such contentions, however, are usually accompanied with the declaration that it is wise to wait until vessels can be purchased at reasonable figures in Europe.<sup>54</sup> It is true that the ships built in this country under the stress of war were costly and that the expense of construction remains high. Yet the same can be said of foreign shipbuilding. At the present time (December, 1919) the United States Shipping Board is disposing of vessels at rates varying from \$90 per dead-weight

<sup>53</sup> *Iron and Coal Trades Review* (London), July 18, 1919, p. 83. See also price lists in July and August numbers and quotations in the *Iron Age* (New York).

<sup>54</sup> A rather interesting discussion to this effect appeared in the *Christian Science Monitor* of October 20, 1919.



ton<sup>55</sup> for wooden craft to \$250 per dead-weight ton for the best steel ships.<sup>56</sup> These prices are supposed to cover costs. When compared with those prevailing before the war, they are extremely high. But they are far from exceptional, under present conditions. A despatch received from the American Embassy in London late in November says:

Two 5000-ton steamers under construction for June delivery have been resold at £36 10s. per ton. A 3000-ton steamer commands about £38 per ton. The price of shipbuilding and steamers continues to rise. As a result of the recent labor trouble, ship-plates have increased in Scotland £2 5s. The proposed increase of 50 per cent in railway freight will cause a further rise in steel prices. The wages of all adult workers in shipbuilding and engineering industries will advance 5 shillings per week on December 1. Incomplete returns on ship completion for October indicate a smaller output than the average for the previous six months. Concrete shipbuilding in the United Kingdom has practically been abandoned. Several yards are idle and others are being refitted for steel construction.

Prices and costs in other countries have shown the same tendency to rise, and in some cases to a more marked extent than in either England or the United States. The new building program of the leading Japanese line company (Nippon Yusen Kaisha) is an excellent illustration. According to this program 69 new steamers are to be built for the company during the next five years in addition to 10 now under construction. The present cost for the 79 steamers is computed to average not less than 500 to 600 yen (\$250 to \$300) per dead-weight ton, and for the best high-speed passenger vessels in this number, at least 1,000 yen (\$500) per ton.<sup>57</sup>

The high construction costs in the United States are by no means unique. They are simply part of a world phenomenon. The prices quoted for British vessels in the despatch above cited are nearly the same as those named by the United States Shipping Board for ordinarily constructed steel steamers, and the estimated costs of the Japanese steamers alluded to, after making due allow-

<sup>55</sup> Dead-weight tonnage expresses the number of 2,240 pounds that a vessel can transport of cargo, stores, and bunker coal. It is the difference between the number of tons of water a vessel displaces "light" and the number of tons it displaces when submerged to the "load water line."

<sup>56</sup> Figures given the writer at the U. S. Shipping Board. See also statement made by J. B. Payne to Southern Commercial Congress, Savannah, Ga., Dec. 8, 1919.

<sup>57</sup> *Journal of Commerce* (New York), Dec. 16, 1919, p. 3.

ance for the character of these vessels, are in excess, if anything, of American prices.

The expense of railroad transportation affects appreciably the cost of shipbuilding in the United States and where a large tonnage has been built in yards remote from the steel-producing region of the country, as was the case during the war period, the addition to cost by transportation is considerable. This may be illustrated by taking the case of a modern freight steamer of 6,000 gross tons and noting the additions made to its cost by transportation charges on the steel of which it is constructed, shipped from Pittsburgh<sup>58</sup> to New York harbor and the Pacific coast, as follows:

Pittsburgh to	Railroad rate per gross ton (carload lots)	Approximate tons of steel in steamer of 6,000 gross tons	Additions to cost of steamer by transportation charges
New York	\$6.048	3,350	\$20,260.80
Pacific coast	28.00	3,350	93,800.00

While these additions are not large compared with the present cost of building a modern freight steamer of the size described, they are appreciable, and in the case of the Pacific coast—other conditions remaining the same—sufficient in normal times to affect the competitive position of the builder in securing orders. So far as the Atlantic coast is concerned, transportation charges are not sufficiently large to handicap seriously the American shipbuilder.

Except in the United States and the United Kingdom, shipbuilding activities are relatively limited. More tonnage is probably now being constructed in Japan than anywhere else outside of the two great English-speaking countries. German shipbuilding, which had grown to formidable proportions by 1914, received a staggering blow from the war. Its revival on anything like the pre-war scale will depend on a number of conditions, of which not the least important is the effect of the loss of the Lorraine iron-ore deposits upon the German iron and steel industry.

Shipbuilding, however, is not ship operation. According to Lloyd's figures for June, 1919, out of a total gross tonnage for the world of 50,919,273, 31,699,648 gross tons, or 62 per cent,

<sup>58</sup> Steel prices are usually quoted in the United States from Pittsburgh as a base. With some variations prices outside of the Pittsburgh district are the Pittsburgh price plus cost of transportation.

were British and American. By the close of 1920, this proportion will in all probability be considerably larger.

British tonnage, as already observed, declined during the war, but it still remains appreciably larger than the tonnage of any other country. British traditions and experience, as well as the resources of the British Empire, are likely to keep the English flag conspicuously present along the ocean lanes of commerce.

American tonnage, as already observed, is very much larger than in 1914 and now constitutes over one fourth of the world's total. As in the case of shipbuilding activities, the question is raised, Is the United States likely to maintain the position she has gained as a shipping nation during the war? Even if American shipyards continue to work at the present or accelerated capacity, will the ships built operate under the American flag?

Few industries are more subject to competitive influences than is water transportation. The ocean is free to the ships of the world, and most seaports are open to vessels flying the flags of all nations, subject to certain minor restrictions and to general port regulations applying to all shipping. The strength of a national mercantile marine is thus determined by the economic conditions under which it operates.

The factors which enter into the economics of ship operation are many. Three of the most important may be discussed briefly. These are fuel costs, labor cost, and what may be called balanced traffic. The coal necessary to the production of steam was much more expensive at tidewater in the United States than in England during the early period of ocean steam navigation. Before the outbreak of war, however, bunker coal, like ship steel, had become as cheap along the Atlantic seaboard as in any other part of the world.<sup>59</sup> There was, however, in the fuel situation one handicap to the operation of an American merchant marine, and that was the lack of supplies of bunker coal for American vessels along the main trade routes remote from the United States. A large steamer needs refueling after traveling four or five thousand miles, and provision with regard to fuel stations along important trade routes had not been made for American shipping. Great Britain's control of the supplies of bunker coal along the principal ocean

<sup>59</sup> Quotations at Cardiff contained in the *Iron and Coal Trades Review* (London) would indicate even lower prices on this side of the Atlantic. Recent quotations show appreciably higher prices for bunker coal in England than in the United States.

highways of the world has been one of the chief factors of her maritime supremacy.<sup>60</sup>

The fuel situation during recent years has undergone some important changes. Oil has begun to take the place of coal. In no country is the new fuel being more extensively adopted than in the United States, where 486 oil-burning steel steamers representing 3,789,733 dead-weight tons are in operation and where the steel program of the United States Shipping Board provides for a total of 1,731 oil-burning vessels under the American flag.<sup>61</sup> The adoption of oil in place of coal is significant in many particulars. The steaming radius of an oil-burning vessel is much greater than that of a coal vessel, thus making it more independent of fuel stations. This radius in the vessels now being constructed in this country will be not less than 10,000 miles. To provide for such refueling as will be necessary, arrangements have been made for the establishment of stations at certain strategic points along the main trade routes of the world. Among important economies subserved by the use of oil are the following:

Less bunker space for a given steaming radius than in the case of coal.

Storage between double-bottoms where neither coal nor cargo can be stored.

Greater despatch in bunkering than in the case of coal.

No labor and machinery necessary for handling ashes.

Elimination of stoking and consequent reduction of the size of crew and labor costs.

Greater thermal efficiency than coal combined with reduction of fuel costs.<sup>62</sup>

While oil will probably be more extensively adopted by the merchant fleets of other countries<sup>63</sup> in the future, its present use is limited compared with that of the merchant marine of the United

<sup>60</sup> Great Britain has put into effect a system of bunker licenses. Order of September 29, 1919.

<sup>61</sup> Information Bureau of the United States Shipping Board, *Shipping Board's Fuel Stations to Girdle the World*.

<sup>62</sup> The best coal contains about 14,500 British thermal units per pound whereas fuel oil averages 18,000 to 19,800 B.t. u. per pound. Broadly speaking 4 barrels of oil are equivalent to one ton of high grade coal in heating power.

<sup>63</sup> British naval vessels made use of oil from the Tampico wells of Mexico during the war. A large part of this oil field is under the control of British interests. American interests, however, are also represented in this region.

States. This more extensive adoption will, for a time at least, favor this country by reducing fuel costs, enlarging cargo space and by making frequent refueling on long voyages unnecessary.

With respect to labor, foreign vessel-owners have been freer to make their own contracts concerning conditions of employment than have those of the United States. The standards of employment maintained by law on American vessels, standards which represent a great advance over those described by Dana in his *Two Years before the Mast*, are higher than those of any other country; and higher standards under comparatively unregulated commercial rivalry often mean greater costs and diminished competitive power. American laws with reference to the employment of seamen are often cited by ship-owners and operators as the real reason why the American flag vanished from the high seas before the war<sup>64</sup> and why it will not be able to maintain itself there after trade has adjusted itself to normal conditions.

What may be called the labor cost of operation is an important item in the total cost of running an up-to-date vessel, although relatively it is not such a large item as is commonly supposed. In the expenditures for maintaining a line of modern steamers current expenses of upkeep, maintenance of terminal facilities, cost of fuel, vessel insurance, allowances for depreciation and amortization, interest on investment, and various other charges, aggregate much more than wages and provisions for crews. On the Great Lakes our seamen's laws coupled with strong trade-union influence have not prevented freight rates from being among the lowest in the world.<sup>65</sup> Furthermore, with the increased use of oil as fuel the amount of labor necessary to operate a given tonnage will be appreciably reduced, making labor cost a relatively smaller item in the total cost than is now the case with coal-burning steamers.

<sup>64</sup> One of the most frequent citations of the effect of American laws with respect to seamen employed on vessels registered in this country is the sale of the steamers operated by the Pacific Mail S.S. Co., shortly after the passage of the La Follette seamen's bill. The Pacific Mail, however, had paid no dividends on its stock from 1900 to 1915 when the steamers were sold, and had an accumulated net deficit of over \$11,000,000 in 1913 before the La Follette law was passed. See *Poor's Manual of Industrials*, 1918, pp. 1174-1178.

<sup>65</sup> The freight on iron ore from Duluth and Superior to lower lake ports averaged in 1910 only 74 cents per long ton or less than one-tenth of a cent per ton mile. Wheat was shipped from Duluth to Buffalo at 1¼ cents per bushel.

What may be called a balanced traffic, that is, traffic which requires a vessel tonnage, which does not vary too widely on outbound and inbound voyages along the same general route, favors the shipping of the country so situated and so industrially developed as to preserve this balance in its export and import trade.<sup>66</sup> While the ocean routes of the world in international trade are generally open to the vessels of all nations, political and financial relationships are closer to that part of a national mercantile marine operating between the country whose flag it flies and other countries than to that part operating mainly between foreign lands. A strategical position therefore on the part of a country with reference to trade movements is an influence of considerable weight in determining the competitive strength of its mercantile marine. One factor in the maintenance of Great Britain's maritime supremacy has been the preservation of such a balance. Great Britain's imports measured in terms of money vastly exceed her exports, but measured in tons of freight imports and exports are more nearly equal.<sup>67</sup> The imports of the United Kingdom consist largely of food products and raw materials for use in manufacture and require a large amount of tonnage. Exports consist of manufactured articles requiring a limited amount of shipping space but commanding high rates and a great amount of coal requiring considerable tonnage but not commanding a high freight rate. The coal, however, has a ballast value and enables British ships to bring back raw material at a rate which shows a profit for the round trip.

The situation of the United States and the general character of her commerce have not been so fortunate. This may be illustrated by comparing for the fiscal years 1914 and 1918 the export and import movement in long tons in the trade with three of the most important regions of the world, and the vessel tonnage required to carry this traffic. This comparison is shown in table 7.

The above figures show the rather one-sided character of American trade so far as weight or measurement tonnage<sup>68</sup> is con-

<sup>66</sup> This balance, of course, is a very different thing from the trade balance measured in money.

<sup>67</sup> On some of the routes in the north Atlantic region there is a great difference in freight tonnage between the outward and inward haul. This is especially true of the traffic moving between the United States and Europe.

<sup>68</sup> Ocean freight is measured by weight or measurement tonnage. The measurement ton is the freight occupying 40 cubic feet of space in the hull of a vessel.

TABLE 7.—EXPORT AND IMPORT TRADE WITH WESTERN EUROPE, EASTERN SOUTH AMERICA AND MEXICO, WEST INDIES AND CARIBBEAN REGION.<sup>1</sup>

	Long tons		Dead-weight tons	
	1914	1918	1914	1918
Western Europe and Mediterranean Africa				
Exports .....	17,200,365	20,458,358	5,731,674	6,810,710
Imports .....	7,435,439	1,939,076	3,099,845	827,325
Difference .....	9,764,926	18,519,282	2,631,829	5,983,385
Eastern South America				
Exports .....	658,094	999,165	282,334	401,331
Imports .....	457,545	897,795	198,229	359,899
Difference .....	200,549	101,370	84,105	41,432
Mexico, West Indies, and Caribbean region				
Exports .....	5,448,751	6,021,294	629,813	722,825
Imports .....	9,062,342	10,859,191	1,159,892	1,294,396
Difference .....	3,613,591	4,837,897	530,079	571,571

<sup>1</sup> U. S. Shipping Board: *Trade and Shipping between the United States and the Principal Regions of the World in 1914 and 1918*. Reports No. 668, pp. 10 and 12 and No. 727, pp. 4, 5, 6 and 8.

cerned. It should be said, however, that in the north Atlantic region where the difference between the export and import movement is most conspicuous and the volume of trade greatest, American shipping is not under a much more serious handicap than British, French, or German shipping, as the trade here is one-sided in the reverse direction from the European standpoint. The accentuation of the one-sided character of this traffic in 1918 as compared with 1914 was due, of course, to war conditions.

In the West Indies, Mexican (over sea), and Caribbean Sea routes the one-sided character of American trade is pronounced. There are some signs that the difference between exports and imports may be reduced somewhat by increasing American exports of coal and heavy iron and steel manufactures. The large importation of iron ore, sugar, petroleum, and tropical fruits seems likely to keep the difference a marked characteristic of this trade. In the eastern South American region, exports and imports (measured in tons) are more nearly equal<sup>69</sup> and display a tendency to

<sup>69</sup> The value of imports from South America greatly exceeds that of exports to South America. However, exports and imports are considered here with reference to vessel space and not in terms of money.

become more so as time goes on. Of the export tonnage in 1914 about 35 per cent consisted of coal and coke and in 1918 about 60 per cent. This increased coal movement, however, is likely to be balanced by greater importations of iron ore from Brazil.<sup>70</sup>

The uncertainty of commercial conditions during the period of readjustment after the war hardly warrants any prediction concerning trade movements in the future. It is not improbable, however, that the falling rates of foreign exchange combined with the transformation in the financial status of this country from a debtor to a creditor nation will affect the relative amounts of exports and imports, particularly on the European routes. Such changes as are likely to result will favor an equalization of freight tonnage on outbound and inbound vessels rather than accentuate inequalities.

Taking the three factors discussed in connection with ship operation, the changes which have taken place during recent years in the use of fuel and in the general trade situation would seem to favor the permanence of the remarkable growth of the American mercantile marine during the war period. There is, however, another factor to which allusion has already been made and which should be recalled in this connection. The United States for two generations has been essentially a country with interests devoted to land pursuits. It has no sea-faring population to speak of and lacks the experience which certain European nations have in the conduct of shipping operations on an international scale. The suddenness with which this country finds itself possessed of a merchant marine not far behind that of Great Britain leaves a big gap between its newly acquired position as the second maritime power of the world and its limited shipping experience. For reasons already given, this position does not seem to be out of accord with economic tendencies and developments. The wonderful growth of our mercantile marine during the last few years has taken place largely under governmental ownership and control. In the judgment of the writer a wise government policy will safeguard, for a time at least, the results which have been achieved until the hiatus between position and experience has been bridged.

The time for the establishment of a strong American mercantile marine is propitious. As has been pointed out in describing the shipping situation, much of the world's vessel tonnage has suf-

<sup>70</sup> The Brazilian iron-ore field north of Rio Janeiro is one of the largest in the world and has the highest grade ore of any field.



fered deterioration and the services on remote trade routes have been considerably curtailed. These conditions will take some time to repair. Competition in the interim will necessarily be less keen than under normal condition. This is not saying, however, that it will be a negligible force.

In governmental policy looking to the permanent establishment of an American merchant marine which will be a factor in world trade, the question of public or private ownership and operation is not involved. The government may continue to own and operate the vessels it has built, it may lease them to private operators, or it may sell them to be both owned and run by private parties. Whatever alternative is adopted the present situation calls for some protective and regulative policy, not because such a policy safeguards an industrial growth artificially stimulated by a war crisis, but because the new development seems to be in line with the new world situation and requires mainly the experience which time and training alone can give.

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